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**General Mills. Inc.**  
**Mechanical Division**

**ENGINEERING RESEARCH & DEVELOPMENT  
DEPARTMENT**

**2003 EAST HENNEPIN AVENUE  
MINNEAPOLIS 13, MINN.**

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FINAL REPORT

CONTRACT NO. Nonr 875(00)

Annex IX

4 April 1954

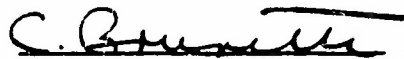
Prepared for

The Office of Naval Research  
Washington, D. C.

Report No. 1303

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Approved by:

  
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GENERAL MILLS, INC.  
Mechanical Division  
ENGINEERING RESEARCH AND DEVELOPMENT  
2003 E. Hennepin  
Minneapolis 13, Minn.

## I. AIMS

On 1 April 1953, Contract Nonr 875(00) between General Mills, Inc. and the Office of Naval Research was amended to provide for the execution of shipboard balloon flights during the summer of 1953 at northerly latitudes. Plastic balloons were used to hoist Deacon rockets with scientific equipment housed in the warhead. The scientific payloads were supplied by the Naval Research Laboratory and Iowa State University. General Mills, Inc. supplied "Skyhook" balloons, balloon controls and safety equipment. Engineering services for launching and telemetering altitude information were also supplied by General Mills technical personnel.

## II. WORK ACCOMPLISHED

The project consisted of two series of launchings from ice-breakers, one series from the U.S.S. Staten Island and the other from the U.S.C.G.C. Eastwind. In general, the series of launchings from the U.S.S. Staten Island were made between Boston, Mass. and Thule, Greenland, from the middle of July to the middle of August, 1953. The series of launchings from the U.S.C.G.C. Eastwind were made the last of August and the first of September between the Straits of Belle Isle and Boston. Specific launch positions are tabulated in the next section.

General Mills balloons were used as vehicles to carry rockets to high altitudes before being fired.

Two types of balloons were used, a 55 foot balloon for all the Iowa State University flights and a 68 foot balloon for the Naval Research Laboratory flights. All flights carried the following equipment:

1. Balloon control instruments, including safety timers and descent switches.

2. Radiosonde, AN/AMT-7A, for telemetering altitude.

3. Deacon rocket.

4. Firing unit for rocket.

5. Scientific payload in warhead of rocket.

The Iowa State University flights carried cosmic ray equipment in the rocket warhead and the Naval Research Laboratory flights were instrumented to measure physical properties of the upper atmosphere.

In the first series, 10 flights were made for Iowa State University, and 4 flights for the Naval Research Laboratory. In the second series, 6 flights were made for Iowa State University and 2 for the Naval Research Laboratory. Of this total of 22 flights, 5 were not successful as a result of failures of the rockets to ignite. One balloon failed prematurely, and on 2 flights the rockets failed to fire but the cause of failure was unknown, and may have included faulty timers.

Except for the Iowa State University flights on the U.S.S. Staten Island series, for which no altitude data are available, the flight data are presented in the next section.

It is hoped that the scientific payload performed satisfactorily and that the entire operation met with success. General Mills, Inc. is happy to have had the opportunity of working with the Office of Naval Research and Iowa State University in carrying out these experiments.

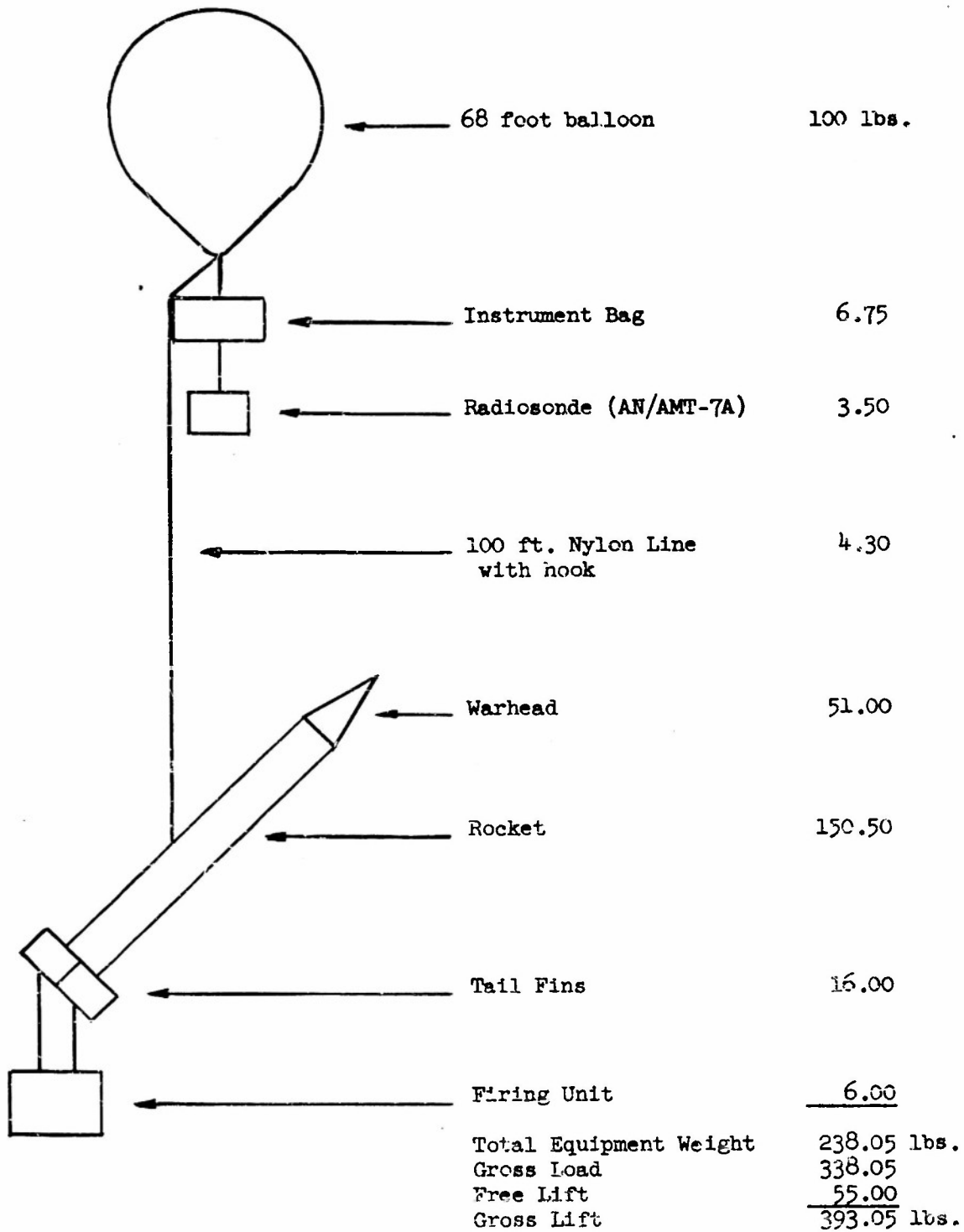
Flights from U. S. S. Staten Island

<u>Flight No.</u>	<u>Date</u>	<u>Time</u>	<u>Launch Position</u>
1011	18 July	2327Z	42-26.2 N, 70-22 W
1012	19 July	2330Z	43-04 N, 65-07 W
1013	19 July	1653Z	43-41 N, 63-28.5 W
1014	19 July	2257Z	44-16 N, 62-09.5 W
1015	24 July	1640Z	58-32.5 N, 61-55 W
1016	28 July	0941Z	62-30.5 N, 64-13.5 W
1017	3 August	1828Z	62-45 N, 66-15 W
1018	5 August	2154Z	62-04 N, 63-55 W
1019	6 August	1507Z	64-20 N, 59-06 W
1020	6 August	1840Z	65-13 N, 58-35 W
1021	8 August	1509Z	73-37 N, 61-37 W
1022	9 August	0554Z	74-23 N, 71-56 W
1023	9 August	0915Z	74-29 N, 73-31 W
1024	11 August	1709Z	74-34 N, 94-29 W

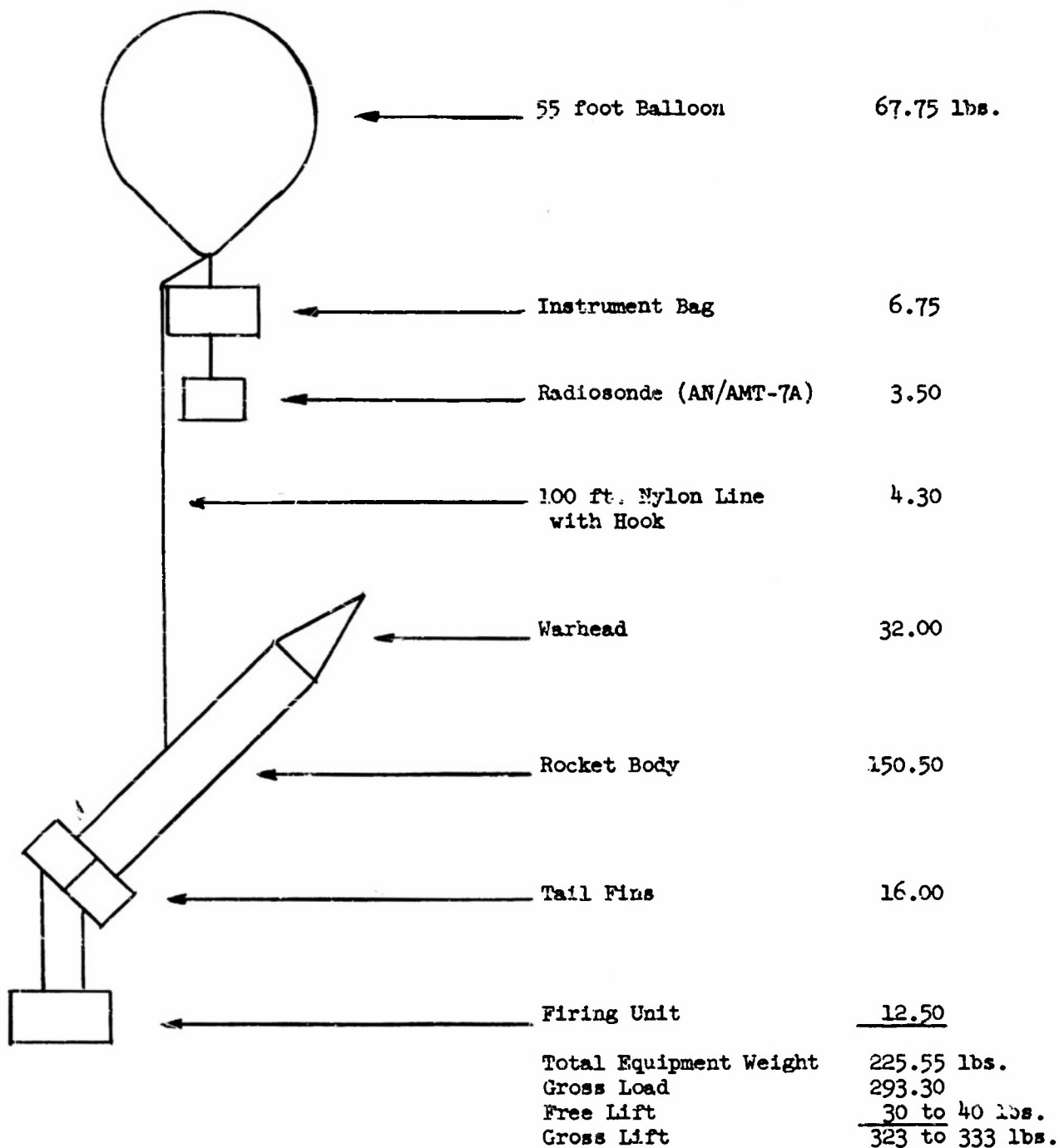
Flights from U.S.C.G.C Eastwind

1025	30 August	1400Z	53-06 N, 55-05 W
1026	30 August	1620Z	52-47 N, 55-24 W
1027	30 August	2046Z	53-08 N, 54-45 W
1028	3 September	0950Z	44-50 N, 57-13 W
1029	3 September	1151Z	44-45 N, 57-10 W
1030	3 September	1405Z	44-33 N, 57-03 W
1031	4 September	0359Z	43-10 N, 59-20 W
1032	4 September	1551Z	43-00 N, 62-30 W

TYPICAL NAVAL RESEARCH LABORATORY TYPE FLIGHT



TYPICAL IOWA STATE UNIVERSITY TYPE FLIGHT





AN/ANT-7A #8441

THEORETICAL CEILING

RATE OF RISE  
915 FT/MIN  
TO 70000 FT

ROCKET FIRED BY PRESSURE SWITCH

FLIGHT NO. 1018

FLOWN 5 AUG 53

FOR 18 5020 NRL

LOAD ON BALLOON 233\*

FREE LIFT 55% = 15.9%

BALLOON TYPE NUMBER MATERIAL WEIGHT

6811 2 ARL #293 107

LAUNCH SITE, 62°04'N 63°55'W  
FROM USS STATION 15 AND  
AT 2155 GCT 5 AUG 53

ELAPSED TIME IN HOURS

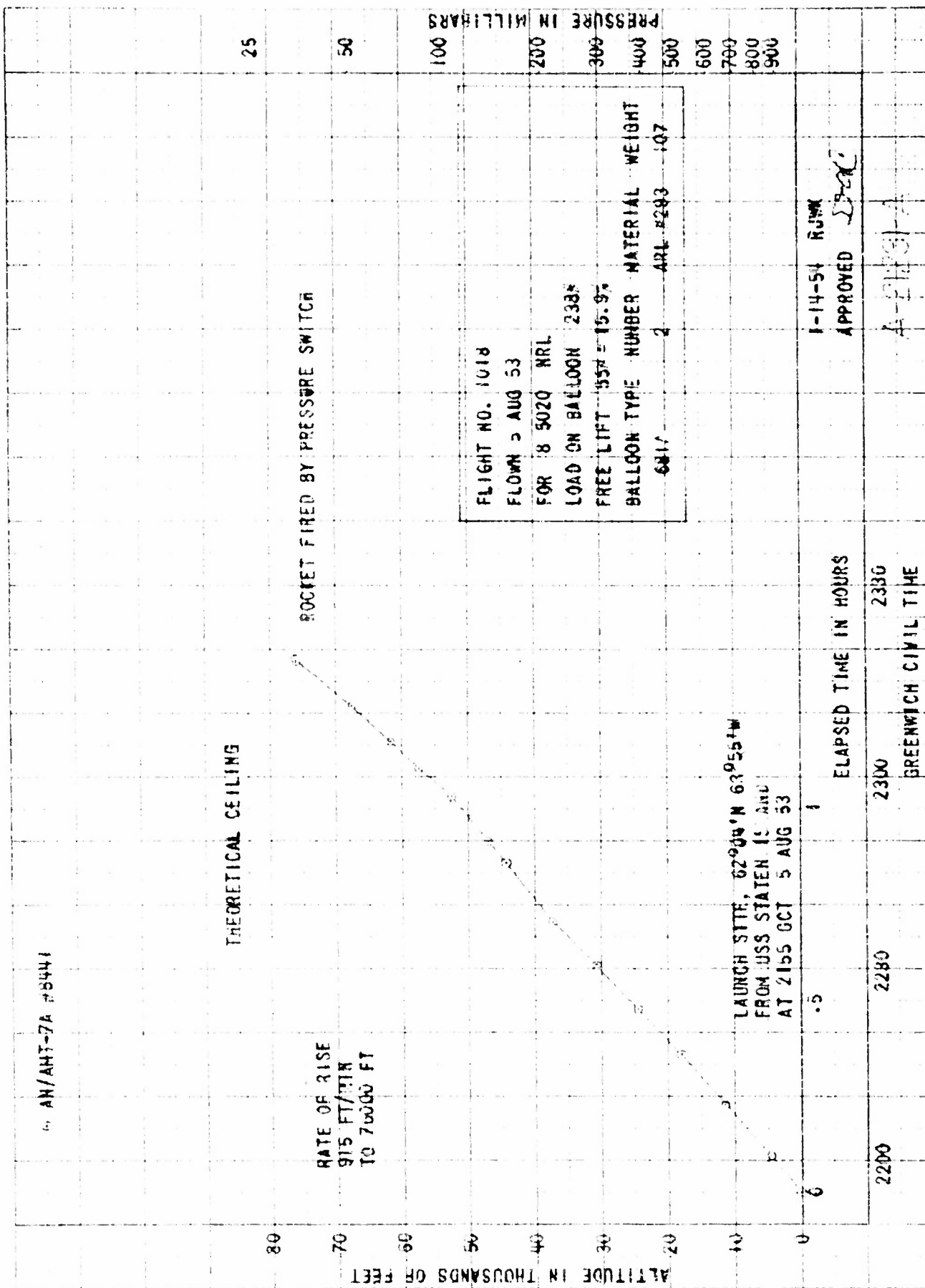
GREENWICH CIVIL TIME

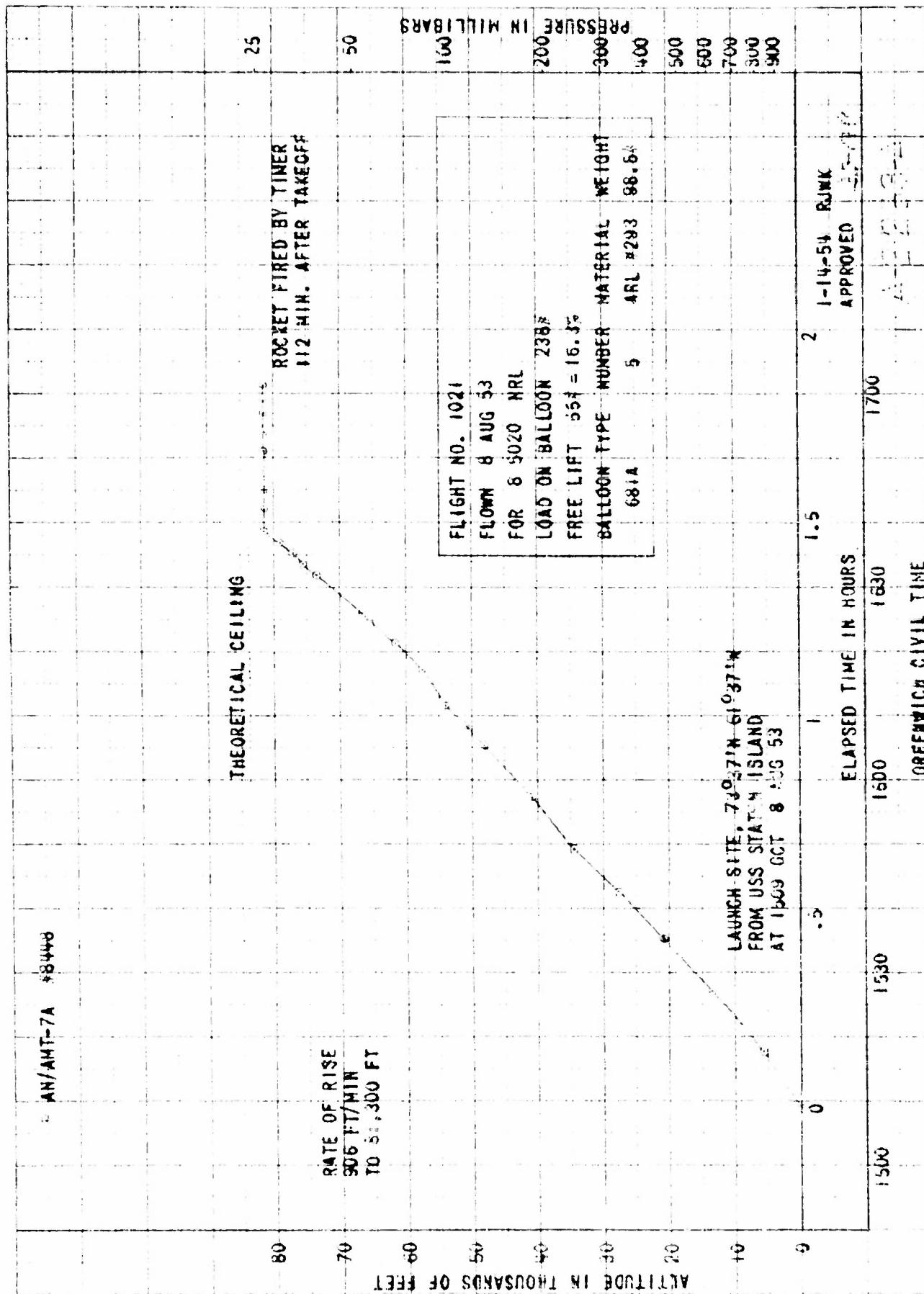
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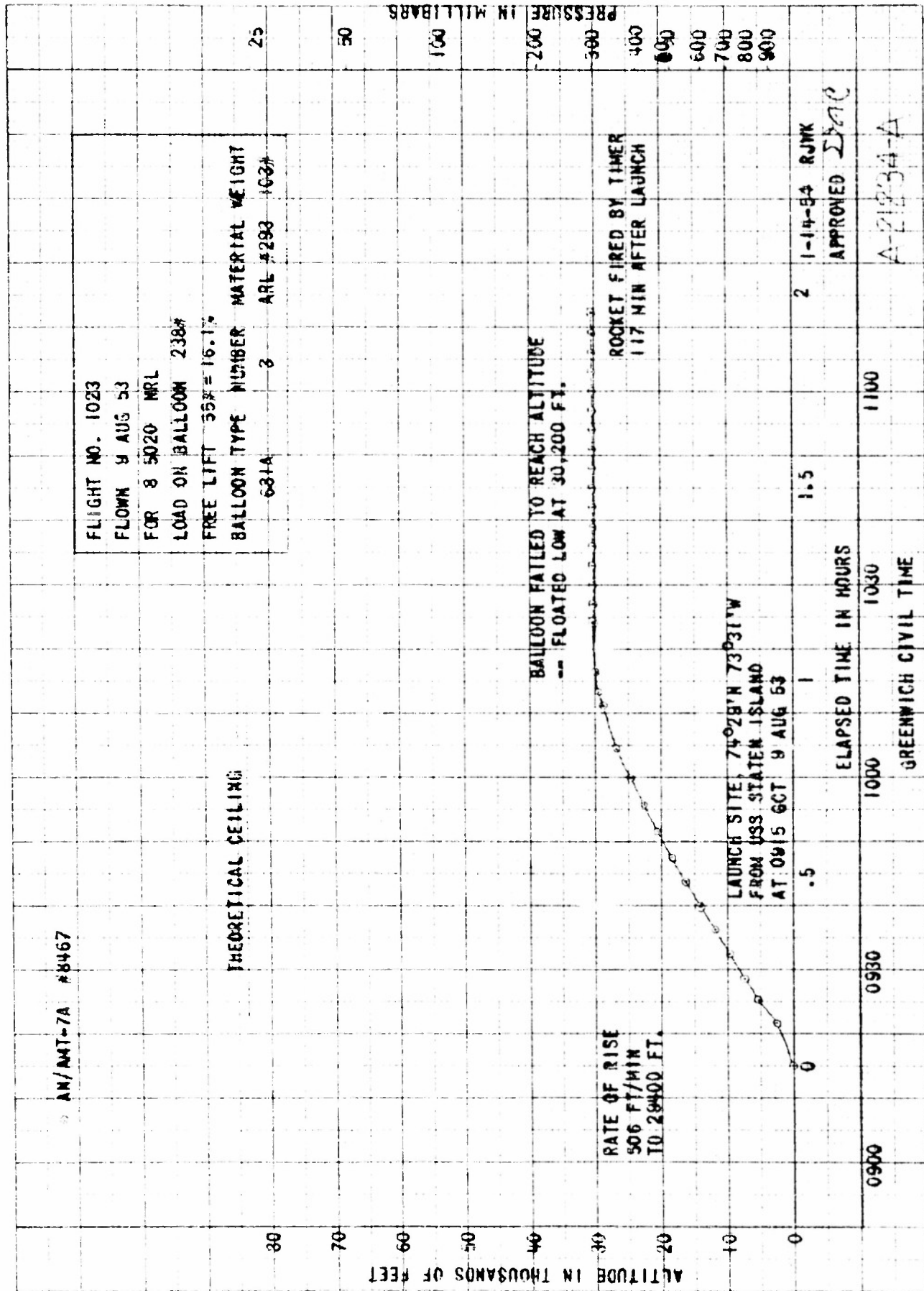
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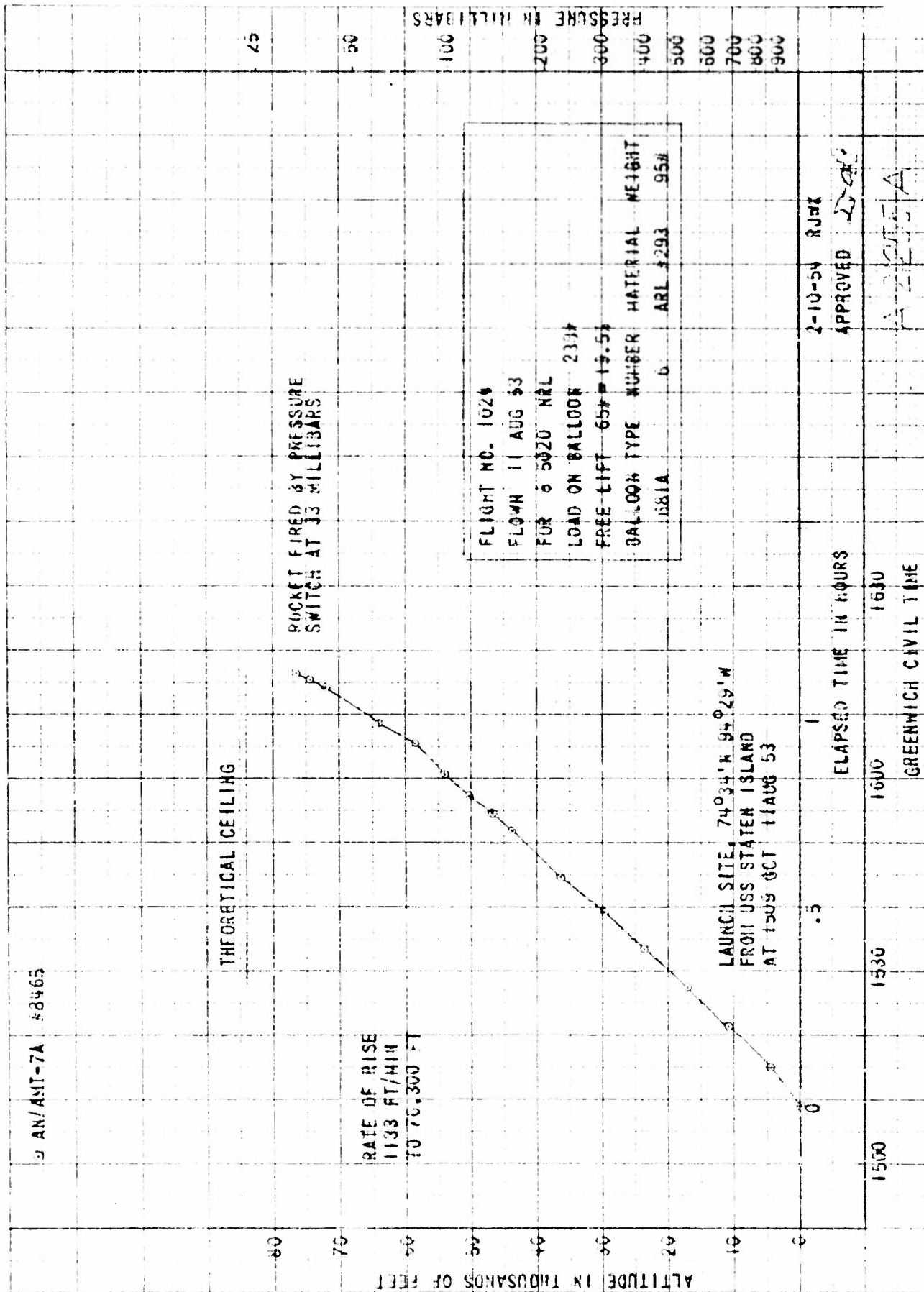
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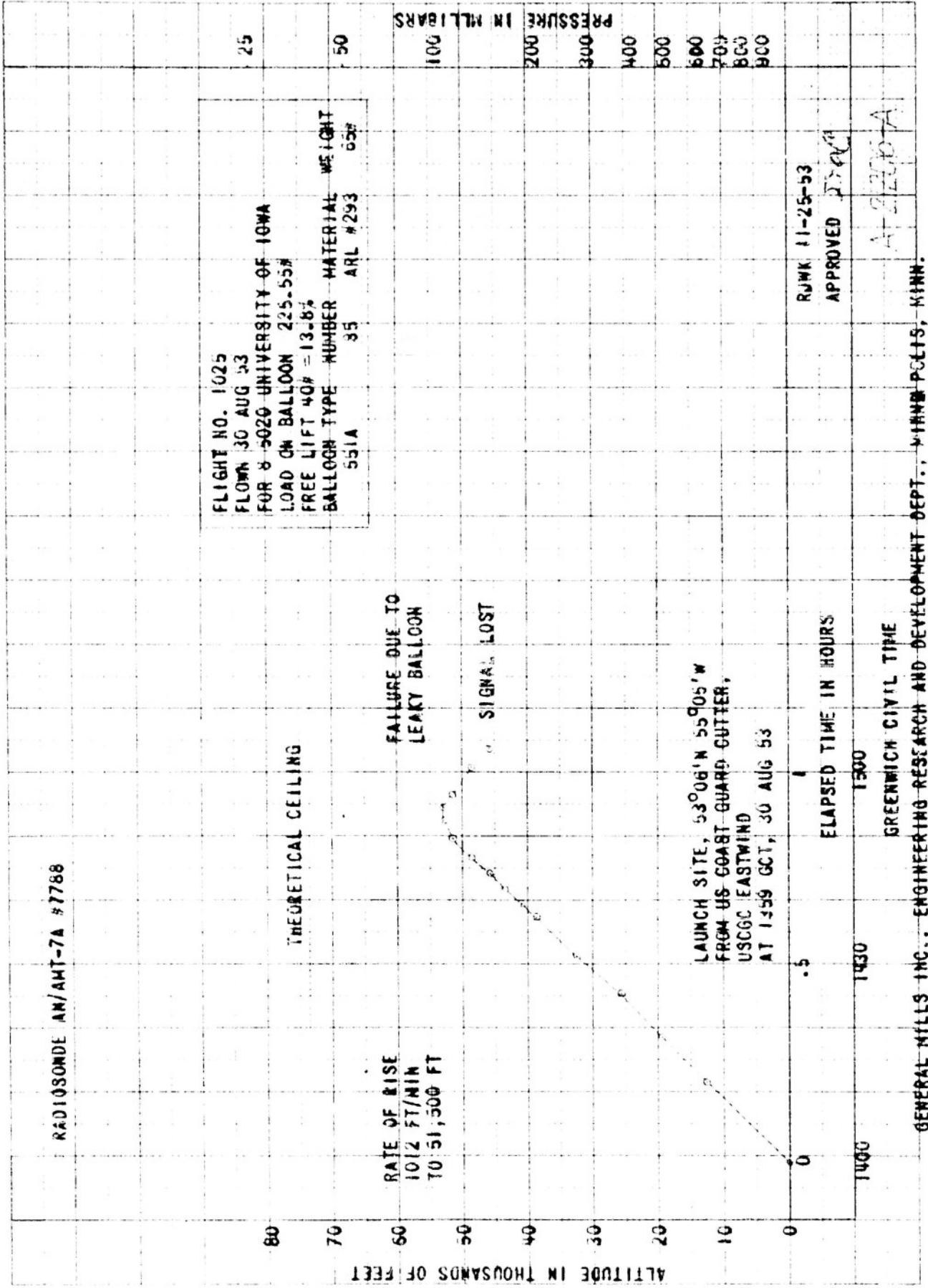


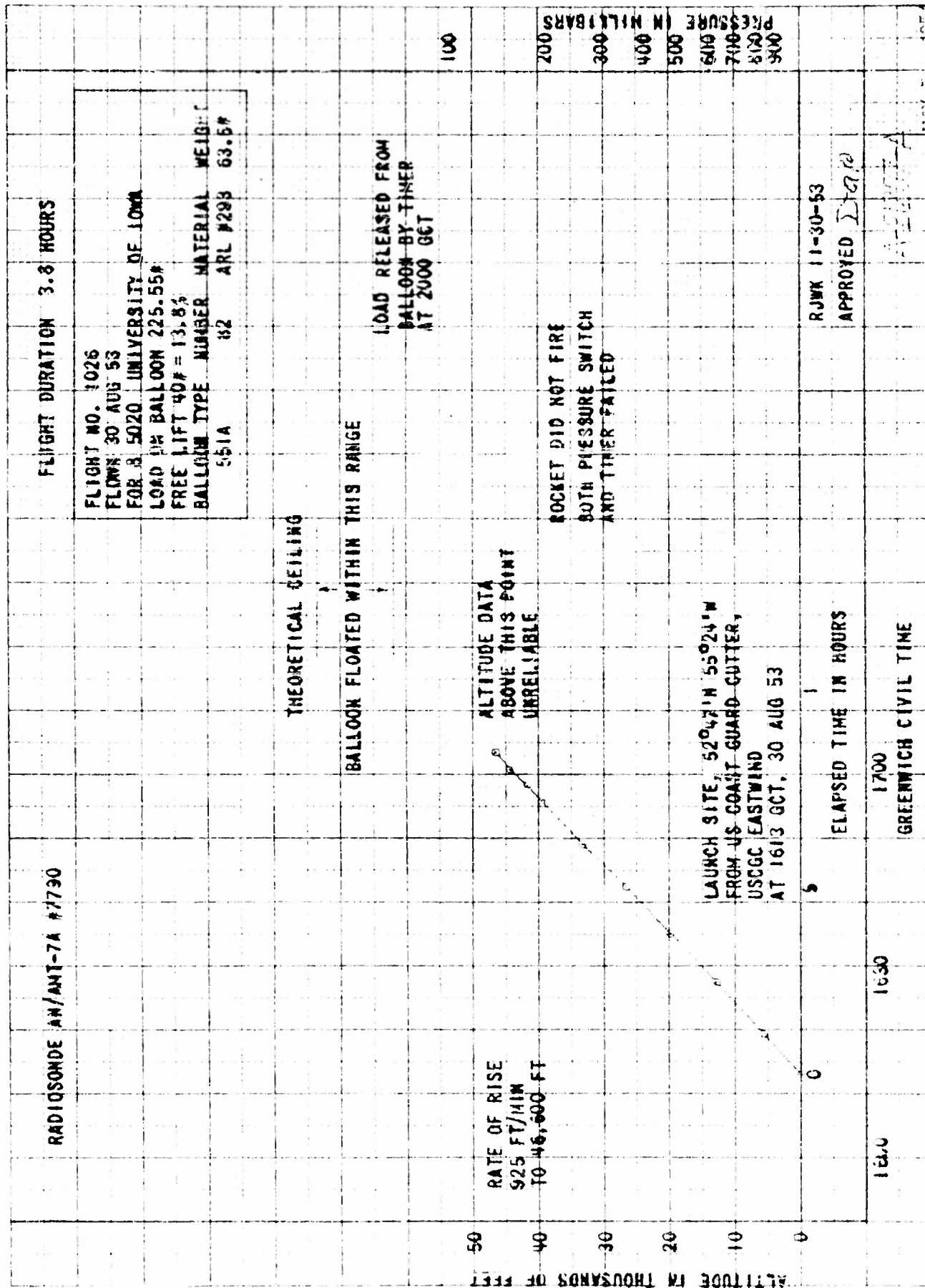


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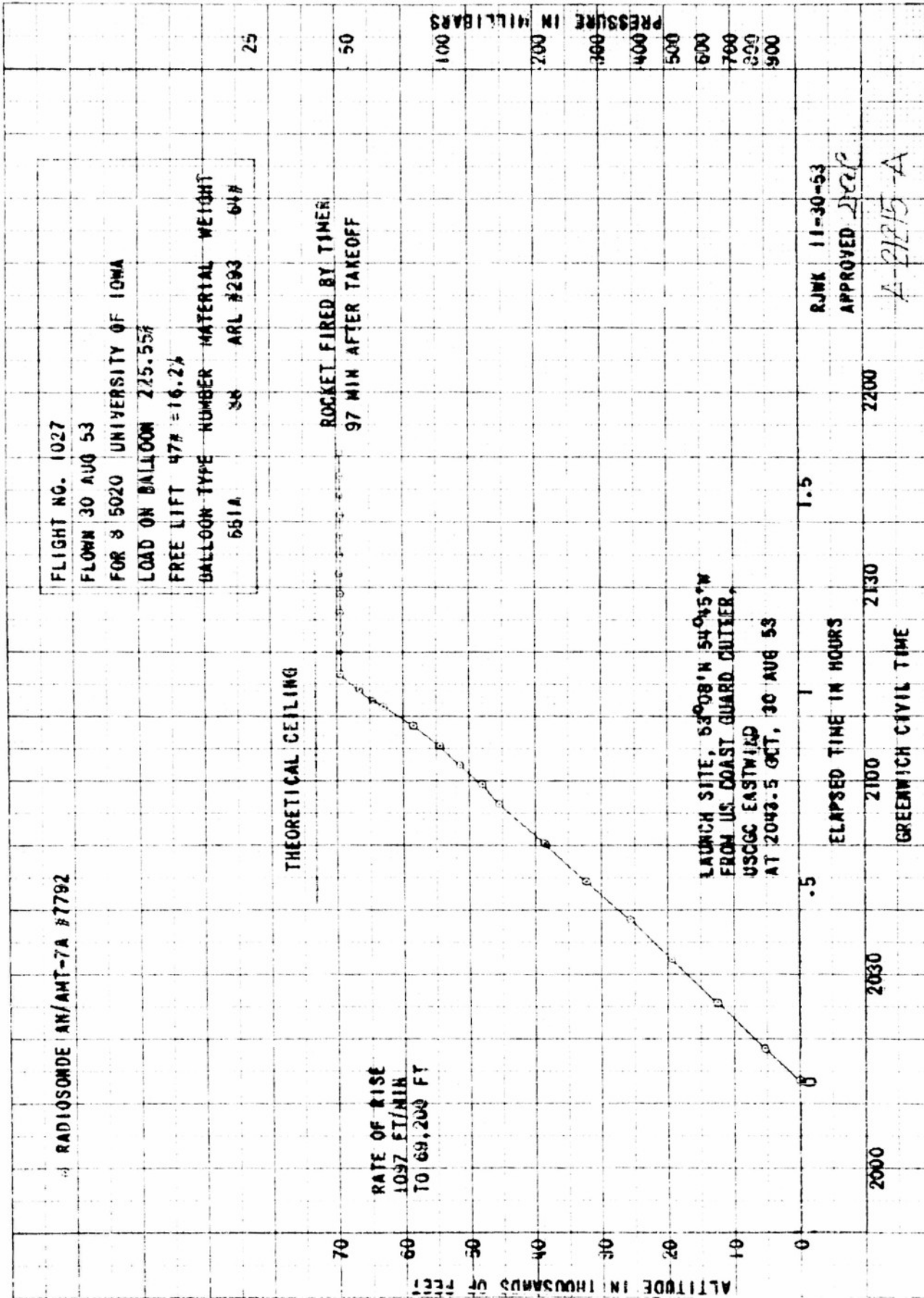


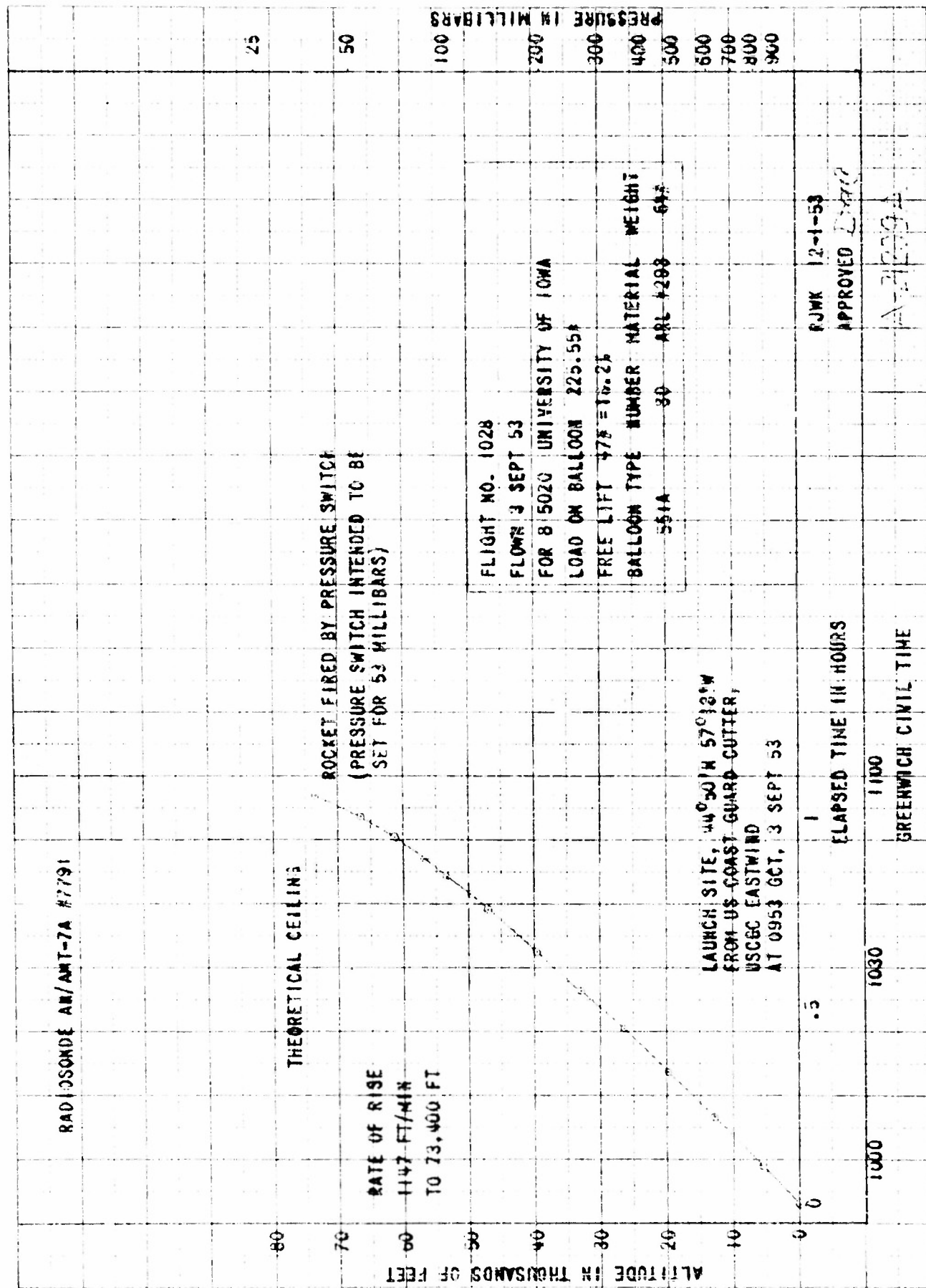














RADIOSONDE AN/AMT-7A #3280

# THEORETICAL CEILING

RATE OF RISE  
1.94 ft/min  
TO 64.800 FT

ROCKET FIRE BY  
PRESSURE SWITCH

LAUNCH SITE. 44°45'N 157°10'W  
FROM US COAST GUARD CUTTER  
USCGC EASTWIND  
AT 1155 GCT 3 SEPT 53

ELAPSED TIME IN HOURS

GREENWICH CIVIL TIME

FLIGHT NO. 1029  
FLOWN 3 SEPT 53

FOR B 5020 UNIVERSITY OF IOWA

LOAD ON BALL OCH 225.55N

FREE LIFT 477 = 16.2%

BALLOON TYPE	NUMBER	MATERIAL	WEIGHT
551A	83	ARL #293	63.5g

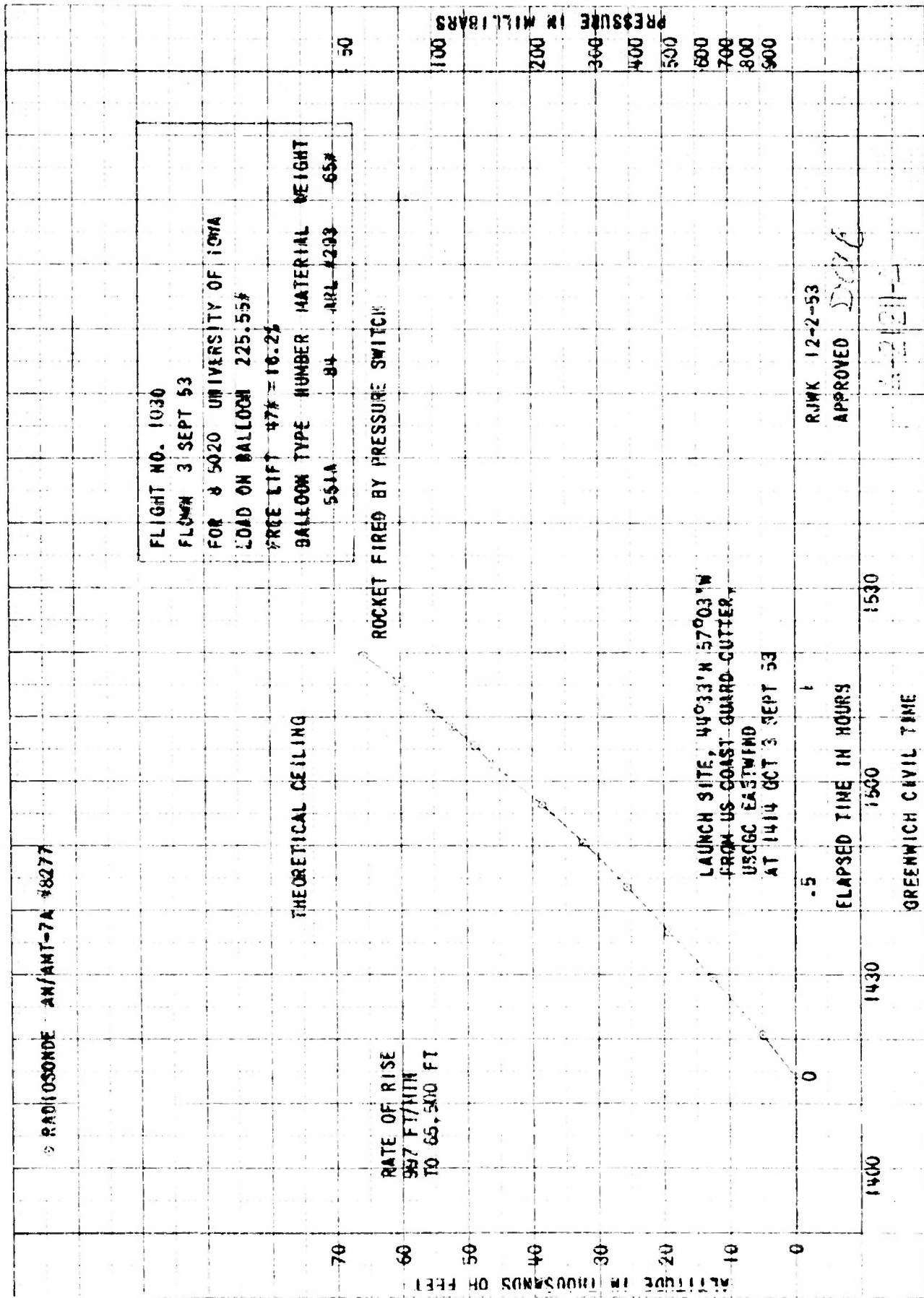
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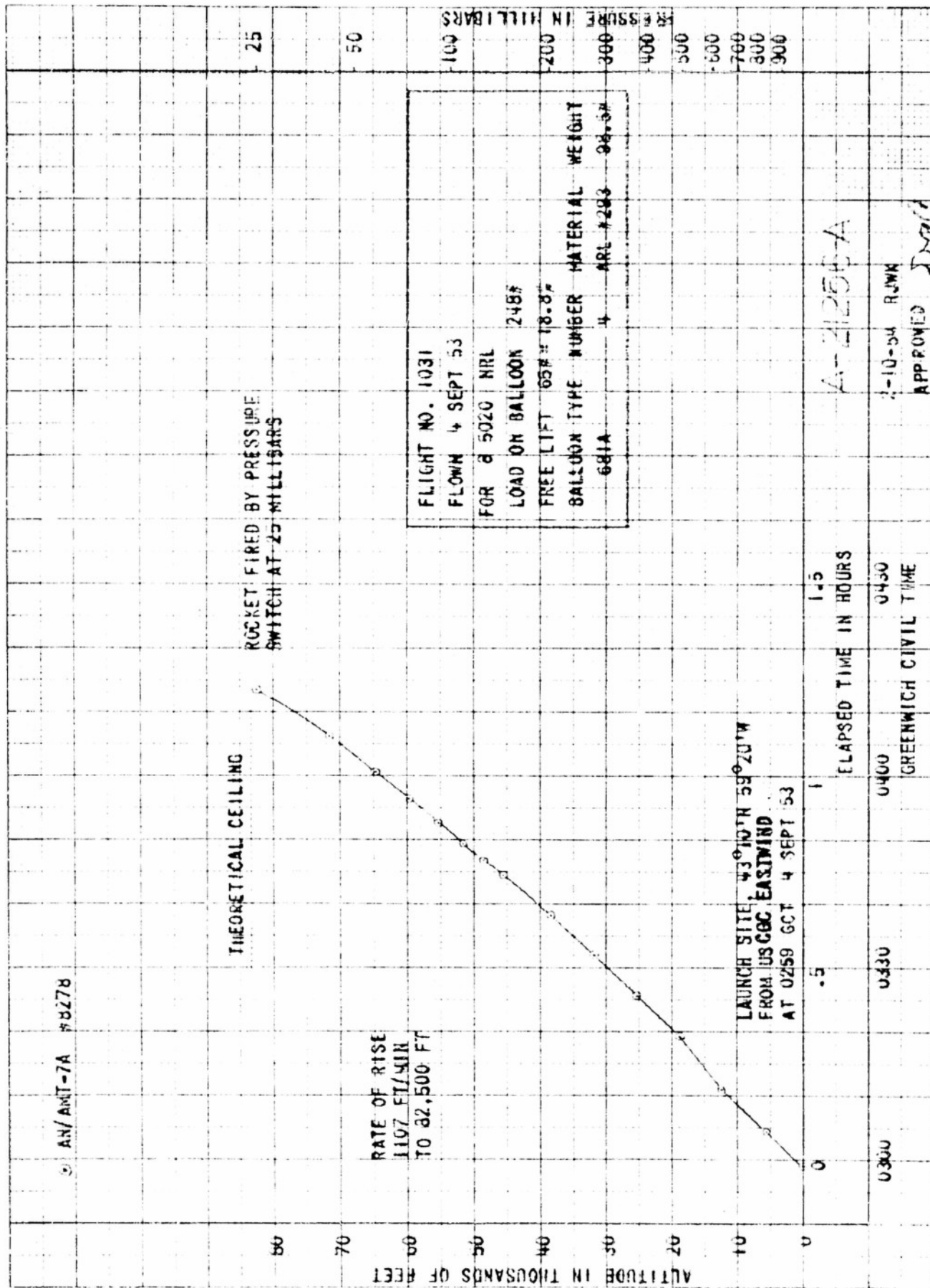
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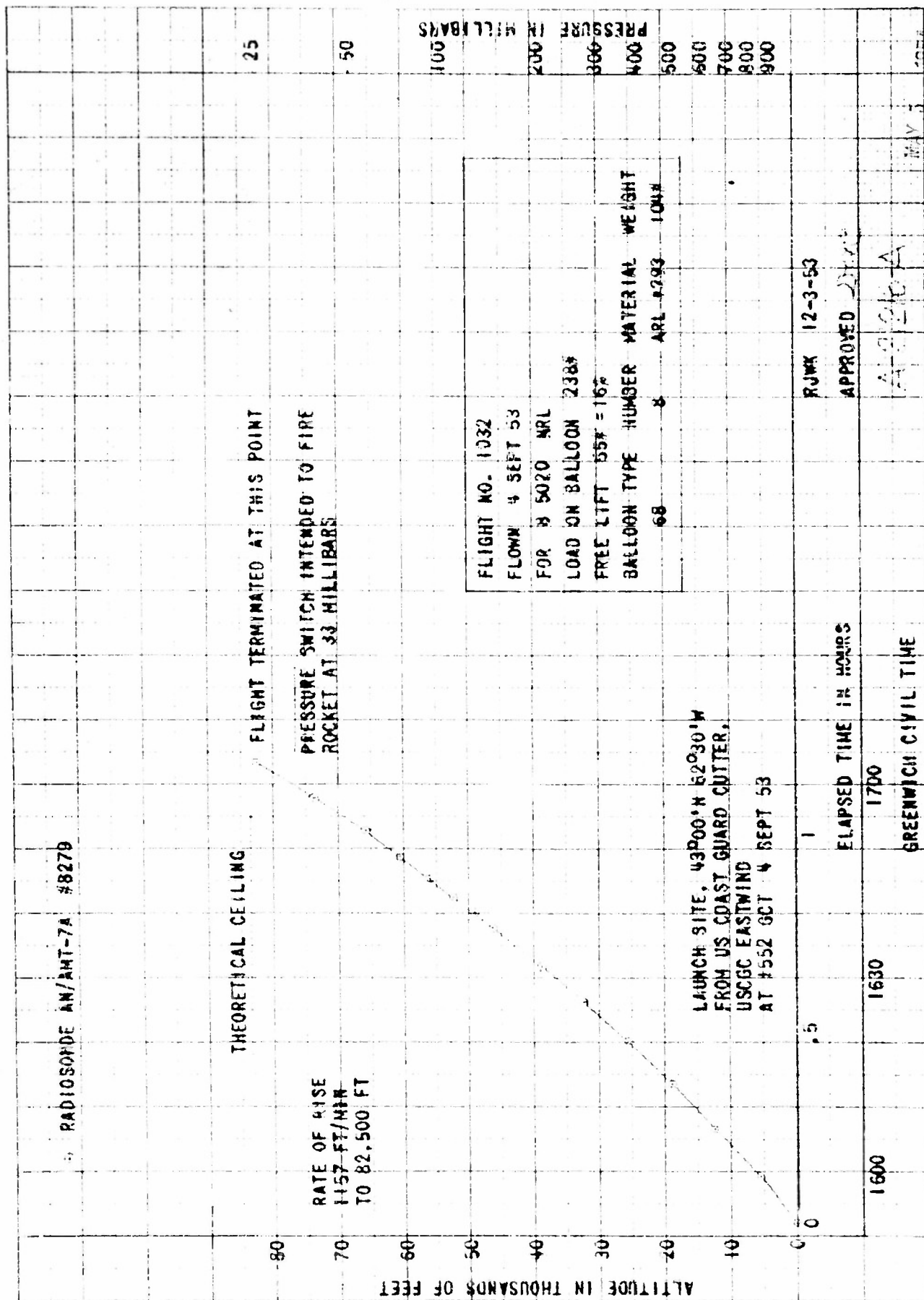
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MAY 1954







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